INDOOR AIR MONITOR
Indoor Air Management Newsletter
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Naval Facilities Engineering Service Center
Environmental Department
NAVOSH Air Branch
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SPONSORING INDUSTRIAL VENTILATION COURSES

NFESC has successfully completed its FY02 Industrial Ventilation (IV) training schedule in San Diego, CA; Chesapeake, VA; and Pensacola, FL. To prepare for FY03, we are looking for sponsors for any of our industrial ventilation courses. There is no cost to sponsor the training. Sponsoring activities must provide a classroom (for about 25 students), and a testing site, preferably a woodshop with a ventilation system. Classes are free to all DOD personnel, with priority given to Navy and Marine Corps personnel. The students' commands are responsible for their travel expenses and per diem. If your activity wants to sponsor one of the IV courses below, please contact Tuan Nguyen at DSN 551-5311, (805) 982-5311, or via e-mail at nguyenth@nfesc.navy.mil.

1**. IV Design, Testing, and Troubleshooting:**

This 4.5-day course provides students with fundamental principles of industrial ventilation design and testing. The design section focuses on system designing and balancing. Students will spend the first part of the course doing calculations on different design problems. The testing section includes a variety of commonly used measurement devices, methods, and procedures in IV system testing. The troubleshooting section includes techniques for inspecting and evaluating IV systems. The course consists of lectures, discussions, design problems, videos, and slide presentations. Students also will have a hands-on opportunity to try various testing instruments and apply different testing methods in a field exercise. This is a complete course for engineering designers; ROICC and SUPSHIP personnel; mid to upper level industrial hygienists; and safety professionals whose work involves system design and balancing, design review, testing, and troubleshooting. Attendees will receive 4.5 certified industrial hygienist (CIH) maintenance points.

2. IV Testing and Troubleshooting:

This 2.5-day course is the testing and troubleshooting part of the Design, Testing and Troubleshooting Course. It provides participants with the fundamental knowledge required to test an IV system. Target audience includes facility engineers; maintenance personnel; ROICC tech reps; SUPSHIP designers; and entry to mid level industrial hygienists and safety personnel who test, monitor, and maintain IV systems. Attendees will receive 2 CIH maintenance points.

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NFESC ASBESTOS MANAGEMENT WORKSHOP

There are still seats available for the NFESC Asbestos Management Workshops (AMW) scheduled for 9-11 July 02, at HRSC Pacific Waipahu, HI. AMW is specifically designed to train activity personnel in the required elements of an asbestos operations and maintenance (O&M) plan. The Naval Occupational Safety and Health Manual, OPNAVINST 5100.23E, requires activities to assign an asbestos program manager and develop and implement an O&M program.

This 3-day course teaches the basics of what is included in an asbestos O&M plan with the aid of lectures, slide presentations, problem discussions, and field exercises. Topics include: Asbestos Program Manager responsibilities, development of an operations and maintenance program, notification and labeling, training, worker protection, inventory and periodic surveillance, record keeping requirements, and work practices (using the NIBS O&M Work Practices Manual). Attendees will receive 3 CIH maintenance points.

Participants of this course include the activity Asbestos Program Manager, safety professionals, industrial hygienists, asbestos inspectors and project designers, and others involved in the overall management of the asbestos program. Prior EPA accredited asbestos training is strongly recommended. The classes are free to all DOD personnel, with Navy personnel given priority. The students' commands are responsible for travel and per diem.

For additional information or to register, contact Jill Hamilton, NFESC 425, at DSN 551-4892, (805) 982-4892, or via e-mail at hamiltonjs@nfesc.navy.mil. Each workshop is limited to a maximum of 30 participants (minimum 20). Dates are subject to change with advance notice.

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VELOCTY--HIGHER IS NOT ALWAYS BETTER

In industrial ventilation, air movement captures the contaminated air, prevents it from escaping out of the hood, transports it through the ductwork, and exhausts it out of the building. Within limit, the faster the airflow, the better control the system has. However, designers should not aim to specify an unnecessarily high velocity, which can be a waste of energy, or worse, make the system ineffective. Followings are examples where higher is not always better.

1. **Slot Velocity**. Slot hoods are commonly used to provide uniform exhaust airflow and an adequate capture. Slot velocity is defined as "air velocity through the opening in a slot-type hood." The function of the slot is to provide uniform air distribution across the face of the hood. Slot velocity does not contribute toward capture velocity. A high slot velocity simply generates more pressure loss. Capture velocity is the air velocity that captures contaminants at any point in front of a hood and conveys them into the hood. As an example, for a multiple-slot hood, capture velocity is calculated by the equation $Q = V (10X^2 + A)$, where Q is the exhaust flow rate, V is the capture velocity at a distance X, and A is the total open area. The equation shows that capture velocity is related to the exhaust volume flow rate and the distance of the contaminant source from the hood, not to the slot velocity. For most slot hoods, a 2,000-fpm slot velocity and 1,000-fpm plenum velocity is a reasonable choice for uniform distribution and moderate pressure drop.

2. **Face Velocity**. Face velocity is defined as "air movement at the hood opening to prevent the escape of contaminated air from the enclosure." Face velocity should be determined by the effectiveness required to protect workers (toxicity, rate of generation, competing air motions, degree of enclosure, etc.). More is not necessarily better for face velocity. The effectiveness of the hood may actually decline at high velocities if there is an obstruction at the face of the hood. If an operator is located at the hood opening, such as in front of a laboratory hood, the ACGIH recommends that the maximum face velocity should not exceed 125 fpm. Higher air velocity will create eddy currents, which could pull contaminant from the hood into the operator's breathing zone.

3. **Duct Velocity**. Duct velocity is defined as "air velocity through the duct cross section." A minimum duct velocity is required to prevent settling of particles in the duct. Unnecessarily high velocities waste energy and may cause rapid abrasion of the duct. Since pressure requirements are proportional to velocity squared, choosing duct sizes that produce unnecessarily high velocities will result in higher pressure loss. In addition to the increased cost of purchasing and operating fans at higher pressures, there is also the cost of selecting stronger materials and construction to avoid collapsing of the duct.

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SAFEGUARDING BUILDINGS AGAINST CHEMICAL OR BIOLOGICAL ATTACK

The Indoor Environment Department of the Lawrence Berkeley National Laboratory has set up a web site for " Advice for Safeguarding Buildings Against Chemical or Biological Attack" at http://securebuildings.lbl.gov/secure.html.

Immediate actions to safeguard a building against chemical and biological attack include "Pre-Event Advice" such as identify fresh air intakes, secure HVAC rooms, develop emergency teams, and plan and practice separate emergency response procedures for indoor and outdoor releases of chem/bio agents. Long term actions include train HVAC operators, upgrade HVAC filters, establish interior and exterior "safe zone," and other considerations in HVAC design. The web site also provides emergency procedures for indoor and outdoor release during chemical or biological attack.

The web site is intended for emergency personnel and for building operators. It contains advice for dealing with a biological or chemical release in a building. The advice on this site is appropriate for small and medium-sized releases such as those that would be expected from a terrorist attack, not for industrial-scale releases such as those at Bhopal, India or Chernobyl, Ukraine. The web site also provides links to other web sites with related information.

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OSHA LAUNCHES ELECTRONIC NEWS MEMO

On March 1, 2002, the Occupational Safety and Health Administration unveiled the premiere issue of its new electronic memo, which will be e-mailed to subscribers on a regular basis.

Called ***QuickTakes***, the e-news memo contains a snapshot of OSHA's activities that support safety and health in the workplace, including news and announcements; background information; and other information of interest to stakeholders. Within the summaries, OSHA will include links to the agency's website, as well as other sites related to safety and health.

The news memo is published bi-weekly and has contained articles on fall protection, asbestos fibers, and injury/illness rates. You can view past or current issues of ***QuickTakes*** on OSHA's website at http://www.osha.gov/as/opa/quicktakes/index.html.
Subscribe to the ***QuickTakes*** e-mail at http://www.osha.gov/delphi-img/QuickTakes/subscribe.html.

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IAM CONNECTION

Readers, below are some quick notes that we gathered on a few unclear industrial ventilation issues. You are welcome to send comments, suggestions, or additional information on these issues.

1. **Adequate Ventilation.** How much is adequate? Many occupational safety and health criteria and standards writers recommend that the designer provide adequate ventilation without defining the term "adequate." Until recently there has been no written definition for the term. We found a definition in NFPA 497, *Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas, 1997 Edition,* that can be applied to processes that could generate flammable conditions.

"Adequate Ventilation. A ventilation rate that affords either 6 air changes per hour, or 1 cfm per square foot of floor area, or other similar criteria that prevent the accumulation of significant quantities of vapor-air concentrations from exceeding 25 percent of the lower flammable limit."

The engineer and OSH professional cannot simply apply the criteria to any operation without evaluating the process. However, for the first time, this definition does give us a starting point or minimum criteria. The term is used in processes where a fire or explosion could occur. It does not address situations when a contaminant effecting health is the stressor of concern.

2. **Periodical Testing of Ventilation System.** How often should a ventilation system be tested? Page 9-2 of the ACGIH *Industrial Ventilation, A Manual of Recommended Practice, 24th edition*, states: "It is recommended that levels of airflow be determined for each branch duct at least annually and whenever there has been a major alternation to the system (e.g., adding or removing branch duct)."

3. **Venting of Flammable Storage Cabinet.** Should all flammable storage cabinets be vented? Is venting required for all flammable storage cabinets? The question often arises when manufacturers build vents into their cabinets. If the cabinet has vents, then the cabinet should be vented. Right? And, if the vents are opened, or the bung plugs removed, then the cabinet is vented. Right? Not necessarily, but if you said yes, you are not alone.

Venting a flammable storage cabinet is not necessary according to the National Fire Protection Association (NFPA). NFPA Code 30 A-4-3.2 states "The storage cabinet shall not be required by this code to be vented for fire protection purposes, and vent openings shall be sealed with the bungs supplied with the cabinet or with bungs specified by the cabinet manufacturer."

Venting a cabinet incorrectly can compromise the ability of the cabinet to protect its contents from fire. If the integrity of the cabinet is compromised because of incorrect venting procedures, hazardous fumes can escape and create a dangerous scenario. Proper room ventilation with adequate air exchanges usually eliminates the need to ventilate cabinets.

Some state and local jurisdictions require the venting of flammable storage cabinets. Your local Fire Marshal can tell you whether local and state codes allow, recommend, or require venting. Venting is only allowed or recommended with strict provisions. According to NFPA A-4-3.2: "If vented, the cabinet should be vented from the bottom with make-up air supplied to the top. Also, mechanical exhaust ventilation is preferred and should comply with NFPA 91, *Standard for the Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying*. Manifolding the vents of multiple storage cabinets should be avoided."

You can find more information regarding the NFPA Code 30 at the National Fire Protection Association Web site: http://www.nfpa.org

To learn more about storing flammables in the workplace, see EZ Facts document No.180, NFPA30: *A Guide to Flammable and Combustible Liquids.* Click on
www.labsafety.com/refinfo/ezfacts/ezf180.htm
http://www.labsafety.com/refinfo/ezfacts/ezf180.htm

(From the Bureau of Medicine and Surgery web page).

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